

LIBRASCOPE

Expanded Memory



DESCRIPTION

The Expanded Memory is a *smart* non-volatile modular mass memory containing a dedicated microprocessor and using bubble memory for the non-volatile storage medium. System design is based on 0.5 megabit modules, each contained on a single 6" x 9" PC card. Memory capacity is expandable from 0.5 to 8 megabytes in 0.5 megabyte increments.

The Expanded Memory is comprised of three functional sections, each containing 6" x 9" PC cards: I/O interface, microprocessor with RAM and ROM memory, and non-volatile bubble memory. For operation below -20°C , a temperature control function is provided. A regulated power supply is included. Modular design makes the unit easily adaptable to a variety of applications by replacement of the I/O cards for different interface requirements, or by replacement of the microprocessor and/or its firmware for different memory management requirements. The system includes diagnostics and emergency erase features.

Mechanical design of the memory permits the installation of twenty-two 6" x 9" PC cards. In the initial configuration the card allocation is as follows:

	Cards
8 megabyte bubble memory	16
LSDB/HSDB serial I/O	2
6809 processor 7 buffers	1
22K bytes RAM and 24K bytes ROM	1
Heater control	1
Spare	1

The motherboard is laid out for a 16-bit bus allowing a direct plug-in replacement of the 6809 processor card with a 68000 version. The memory card allows room for expanding to 22K (16-bit) words of RAM and 24K words of ROM when the 16-bit bus is used. Addition of a spare card allows an increase of 28K words of RAM.

Modular design of the system architecture allows a variety of I/O requirements to be met by replacement of the I/O cards and maintaining the same DMA transfer for the I/O to and from the RAM buffer. Interface options include the GYK-12 and the 1666B. A dual port system can be implemented by removal of one megabyte of bubble memory (two cards) and replacement with a second set of I/O cards. Both ports have access to the total bubble memory.

DESIGN CHARACTERISTICS (BASIC DESIGN)

Memory capacity: 8 megabytes max.

I/O Data Transfer Rate:

High speed: 1 megabit/sec continuous. 8K byte bursts at 2 megabit/sec

Low speed: 333K bit/sec continuous

Access Time: 40 ms average, 80 ms max.

Emergency Erase: 2 minutes for 8 megabytes

Page Size: 1K bytes based on 1 megabit data rate (16 bubbles running in parallel).

Operating Temperature Range (without the use of heaters): -20°C to $+63^{\circ}\text{C}$ ambient. With the use of built-in heaters, operation is extended to -45°C .

Storage Temperature Range: -55°C to $+100^{\circ}\text{C}$. (Without loss of stored information).

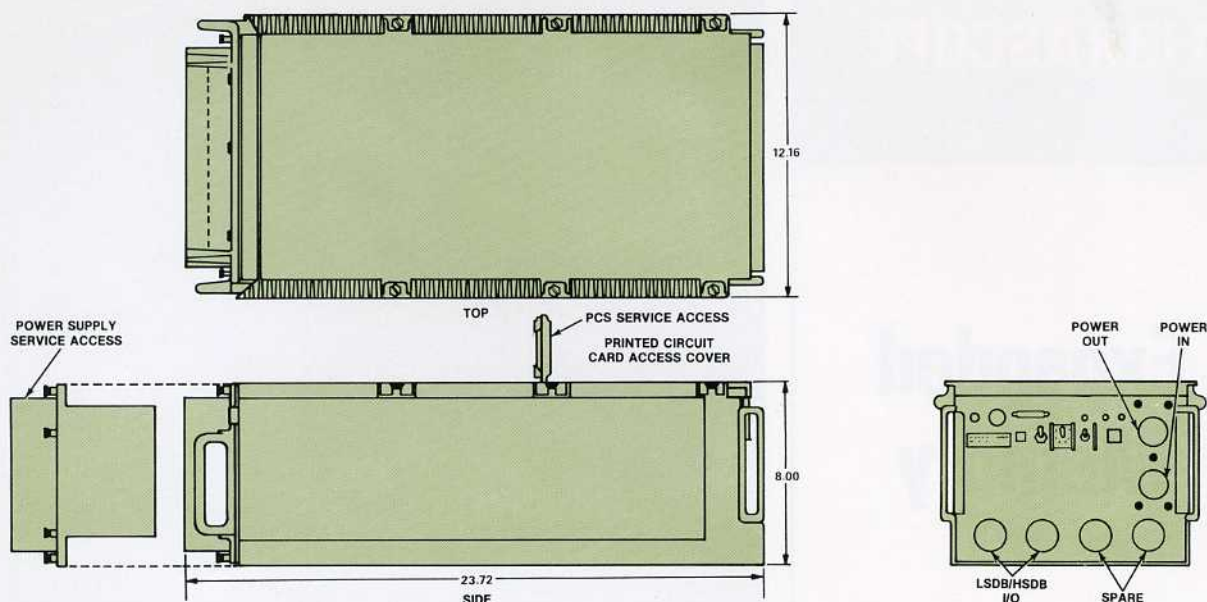
Input Power (including maximum heater power): 25 amps at 22 to 36 VDC unregulated.

Power Allocation: 180 watts operating (16 bubbles reading or writing in parallel). 30 watts standby (Bubbles not operation). Heater power used is controlled by microprocessor and depends on temperature and whether system is in standby or operating. Maximum heater power is 500 watts. Warm up time from -45°C approximately 10 minutes.

Unit Size: 8 in. H x 12.5 in. W x 25.5 in. D.

Unit Weight: 75 lbs.

MOUNTING FACILITIES



ENVIRONMENTAL SPECIFICATIONS

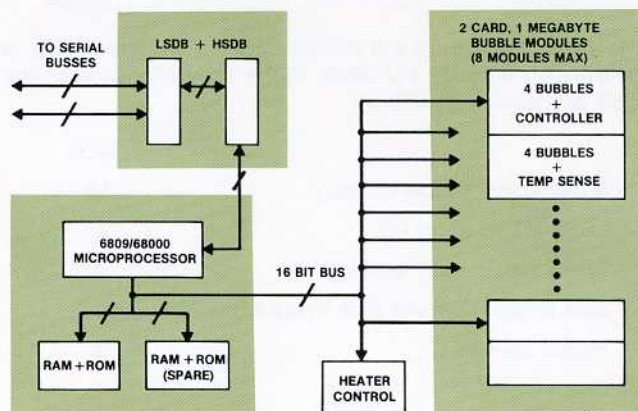
Altitude:	Operation to 10,000 ft. Transport to 50,000 ft.
Temperature:	MIL-STD-810B, Method 501, Procedure II. Operational -45°C to +60°C. Storage -57°C to +71°C.
Humidity:	MIL-STD-810B, Method 507, Procedure III.
Vibration:	5.0 to 5.5 Hz at 1.0 inch double amplitude. 5.5 to 30 Hz at 1.5G. 30 to 48 Hz at 0.036 inch double amplitude. 48 to 500 Hz at 4.0G.
Shock:	MIL-STD-810B, 15G, 11 millisecond shocks on three mutually perpendicular axes.
Immersion:	MIL-STD-810B, Method 512, Procedure I.
Rain:	MIL-STD-810B, Method 506, Procedure I.
Sand and Dust:	MIL-STD-810B, Method 510, Procedure I.
Salt Fog:	MIL-STD-810B, Method 509, Procedure I.
Acoustic Noise:	SCL-1280D, Para. 4.7.4.
Fungus:	MIL-STD-810B, Method 508.
Bench Handling:	MIL-STD-810.
Electromagnetic Interference:	MIL-STD-461, Notice 4. CE01 CS01 RE02 RS03 CE04 CS02 RE02.1 RS03.1 CS06

Chemical, Biological, Radiological:	TM3-220
Other:	Meets TEMPEST and Nuclear Survivability Requirements.

POWER REQUIREMENTS

Voltage:	22 to 30 VDC vehicular power per MIL-STD-1275 (AT) except for Para. 5.4 Abnormal System Without Battery Support. 22 to 30 VDC mobile generator power per MIL-STD-1332B, Class 2C.
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FUNCTIONAL DIAGRAM



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